CLAIMS

What is claimed is:

1. A computer aided design (CAD) system for designing high performance circuits, said CAD system comprising:

a graphical user interface (GUI) having input fields including conductor and dielectric input fields; and

a field solver using conductor and dielectric inputs to determine circuit interconnection electric parameters.

2. A CAD system as in claim 1, wherein said input fields are geometric and property specification input fields.

3. A computer aided design (CAD) system comprising:

a template generation engine generating templates from interconnect configuration files;

a field solver generating broadband passive element relationships from said templates;

a circuit builder generating circuit description files from device technology models and said broadband passive element relationships; and

a simulator simulating circuit responses for transmission line models from said circuit description files.

4. A CAD system as in claim 3, further comprising:

a geometry and material definition module receiving process description and generating said interconnect configuration files.

5. A CAD system as in claim 4, wherein process inputs are varied in said process description through a graphical user interface (GUI).

6. A CAD system as in claim 5, wherein conductor geometric and property specifications and dielectric geometric property specifications for interconnect wiring layers are provided to said GUI.

7. A CAD system as in claim 5, wherein said interconnect configuration files include two dimensional inductance templates and three dimensional per unit capacitance values for interconnect wiring layers.

8. A CAD system as in claim 5, wherein templates include two dimensional (2D) inductance templates and three dimensional (3D) capacitance templates.

9. A CAD system as in claim 5 wherein said 2D and 3D capacitance templates are combined to provide multiple dielectric stack inclusion in capacitance calculation.

10. A CAD system as in claim 5, wherein said broadband passive relationships include frequency dependent resistance and inductance for selected signal conductors.

11. A CAD system as in claim 5 wherein two dimensional and three dimensional resistance and inductance templates are combined to provide wide-band circuit parameters.

12. A CAD system as in claim 5 wherein said template generation engine generates two dimensional (2D) broadband inductance templates for lines in a first layer, said 2D broadband inductance templates including far reference conductors in said first layer and in at least each of a layer above and below said first layer.

13. A CAD system as in claim 5 wherein said template generation engine generates three dimensional (3D) templates for capacitance calculation in a signal layer, said 3D

templates including variable orthogonal wiring density in layers above and below said signal layer.

14. A CAD system as in claim 5, wherein said GUI displays simulated said circuit responses.

15. A CAD system for designing high performance circuits, said CAD system comprising:

a graphical user interface (GUI) having input fields including conductor and dielectric input fields;

a geometric conductor configuration module combining said conductor and dielectric field inputs, said geometric conductor configuration module producing an interconnect structure representation bounded by electromagnetic boundary conditions; and

a field solver using produced said interconnect structure and the electromagnetic boundary conditions to determine interconnection structure parameters.

16. A CAD system as in claim 15, wherein said input fields are geometric and property specification input fields.

17. A CAD system, as in claim 16, wherein said geometric conductor configuration module produces a two dimensional (2D) conductor representation.

18. A CAD system, as in claim 17, wherein said 2D conductor representation is a 2D capacitive representation.

19. A CAD system, as in claim 18, wherein said 2D capacitive representation further includes a conductance representation of dielectric properties.

20. A CAD system, as in claim 19, wherein said 2D representation process is a 2D inductive representation.

21. A CAD system, as in claim 20, wherein said 2D inductive representation further includes a resistive representation of conductors and dielectric properties.

22. A CAD system, as in claim 21, wherein said 2D inductive representation further includes frequency dependent inductance effects.

23. A CAD system, as in claim 22, wherein the frequency dependent inductance effects include skin effects, proximity effects and return path proximity effects.

24. A CAD system, as in claim 23, wherein said geometric conductor configuration module produces a three dimensional (3D) conductor representation.

25. A CAD system, as in claim 24, wherein said 3D conductor representation is a 3D capacitive representation.

26. A CAD system, as in claim 24, wherein said 3D conductor representation is a 3D inductive representation.

27. A CAD system as in claim 24 that generates circuit netlists for simulation, said netlists providing an equivalent synthesized circuit based representation of frequency-dependent net behavior.

28. A CAD system as in claim 24 that generates parameterized netlists.